

Amendments to the Claims

The following listing of claims replaces all prior versions of the claims and all prior listings of the claims in the present application.

Claims 1-33 (canceled)

Claim 34 (new): A process for manufacturing a tyre compound, wherein the compound comprises at least the following ingredients:

- a polymer base;
- a silica reinforcing filler;
- a silica-binding agent; and
- further product and process additives;

wherein the process comprises:

- combining the ingredients to produce a blend; and
- combining the blend with a crosslinking system to produce the compound;

wherein combining the ingredients to produce the blend is carried out in a closed mixer comprising a piston and a pair of rotors,

wherein, during a manufacturing cycle, values of at least two indirect parameters are checked at least every two minutes,

wherein the at least two indirect parameters comprise blend temperature and power absorbed by the rotors,

wherein at least two direct parameters comprise pressure exerted by the piston and rotations of the rotors,

wherein the at least two indirect parameters are maintained within respective ranges of predetermined values by controlling one or more of the at least two direct parameters, and

wherein combining the ingredients to produce the blend comprises a silicization phase followed by a silanization phase.

Claim 35 (new): The process of claim 34, wherein the blend temperature substantially increases during the silicization phase.

Claim 36 (new): The process of claim 34, wherein the blend temperature substantially increases during the silicization phase due to at least three peaks of supplied power.

Claim 37 (new): The process of claim 36, wherein the at least three peaks of supplied power are obtained by lowering the piston toward the rotors.

Claim 38 (new): The process of claim 34, wherein the blend temperature is substantially constant during the silanization phase.

Claim 39 (new): The process of claim 34, wherein the blend temperature substantially increases during the silicization phase, and

wherein the blend temperature is substantially constant during the silanization phase.

Claim 40 (new): The process of claim 39, wherein the blend temperature substantially increases during the silicization phase due to at least three peaks of supplied power.

Claim 41 (new): The process of claim 40, wherein the at least three peaks of supplied power are obtained by lowering the piston toward the rotors.

Claim 42 (new): The process of claim 34, wherein a rotation speed of the rotors during the silanization phase is substantially constant.

Claim 43 (new): The process of claim 34, wherein the silicization phase comprises at least three cycles carried out at different rotation speeds of the rotors, and wherein the rotation speeds of the rotors gradually decrease.

Claim 44 (new): The process of claim 34, wherein during a manufacturing cycle, the values of the at least two indirect parameters are checked at least every thirty seconds.

Claim 45 (new): The process of claim 34, wherein during a manufacturing cycle, the values of the at least two indirect parameters are checked at least every fifteen seconds.

Claim 46 (new): The process of claim 34, wherein during a manufacturing cycle, the values of the at least two indirect parameters are checked more than once per second.

Claim 47 (new): The process of claim 34, wherein the ingredients comprise, per one hundred parts-by-weight (phr) of the polymer base:

the polymer base	100 phr;
the silica reinforcing filler	10-80 phr; and
the silica-binding agent	4%-15% of the silica.

Claim 48 (new): The process of claim 47, wherein the respective ranges of values are predetermined for each specific compound to be manufactured.

Claim 49 (new): The process of claim 47, wherein the respective ranges of values are predetermined for each specific compound to be manufactured by:

a) determining, for a specific reference compound, average values and related variability ranges for a plurality of properties of a blend of the specific reference compound, a composition of the specific reference compound before vulcanization, and a composition of the specific reference compound after vulcanization;

b) producing a sample using selected initial process parameters;

c) determining, for the sample, values for a plurality of properties of a blend of the sample, a composition of the sample before vulcanization, and a composition of the sample after vulcanization;

d) comparing corresponding values of the plurality of properties of the specific reference compound and the sample;

e) modifying at least one of the selected initial indirect parameters related to one or more sample values that may be outside of corresponding average values and related variability ranges of the specific reference compound;

f) repeating b), c), d), and e) until all sample values are inside of the corresponding average values and related variability ranges of the specific reference compound; and

g) setting, as the respective ranges of predetermined values of the at least two indirect parameters for each specific compound to be manufactured, average values of the initial indirect parameters and related variability ranges of the initial indirect parameters that result in all sample values being inside of the corresponding average values and related variability ranges of the specific reference compound.

Claim 50 (new): The process of claim 49, wherein the plurality of properties of the blend of the sample comprises viscosity and a percentage of silica-binding agent reacted with silica reinforcing filler.

Claim 51 (new): The process of claim 50, wherein the plurality of properties of the blend of the sample are determined in an absence of a crosslinking system.

Claim 52 (new): The process of claim 49, wherein the plurality of properties of the composition of the sample before vulcanization comprises viscosity, a percentage of silica-binding agent reacted with silica reinforcing filler, and rheometric properties.

Claim 53 (new): The process of claim 49, wherein the plurality of properties of the composition of the sample after vulcanization comprises density, hardness, modulus of elasticity, breaking load, and elongation.

Claim 54 (new): The process of claim 34, wherein the ingredients comprise, per one hundred parts-by-weight (phr) of the polymer base:

the polymer base	100 phr;
the silica reinforcing filler	40-80 phr; and
the silica-binding agent	4%-15% of the silica.

Claim 55 (new): The process of claim 34, wherein the ingredients comprise, per one hundred parts-by-weight (phr) of the polymer base:

the polymer base	100 phr;
carbon black	0-80 phr;
the silica reinforcing filler	10-80 phr;
the silica-binding agent	4%-15% of the silica;
zinc oxide (ZnO)	1-3 phr;
stearic acid	0-3 phr;
anti-deteriorating agents	1-3 phr;
plasticizing oil	0-30 phr;
anti-ozone wax	0.5-3 phr; and
specific chemical ingredients	0-15 phr.

Claim 56 (new): The process of claim 55, wherein the respective ranges of values are predetermined for each specific compound to be manufactured.

Claim 57 (new): The process of claim 55, wherein the respective ranges of values are predetermined for each specific compound to be manufactured by:

a) determining, for a specific reference compound, average values and related variability ranges for a plurality of properties of a blend of the specific reference compound, a composition of the specific reference compound before vulcanization, and a composition of the specific reference compound after vulcanization;

b) producing a sample using selected initial process parameters;

c) determining, for the sample, values for a plurality of properties of a blend of the sample, a composition of the sample before vulcanization, and a composition of the sample after vulcanization;

d) comparing corresponding values of the plurality of properties of the specific reference compound and the sample;

e) modifying at least one of the selected initial indirect parameters related to one or more sample values that may be outside of corresponding average values and related variability ranges of the specific reference compound;

f) repeating b), c), d), and e) until all sample values are inside of the corresponding average values and related variability ranges of the specific reference compound; and

g) setting, as the respective ranges of predetermined values of the at least two indirect parameters for each specific compound to be manufactured, average values of the initial indirect

parameters and related variability ranges of the initial indirect parameters that result in all sample values being inside of the corresponding average values and related variability ranges of the specific reference compound.

Claim 58 (new): The process of claim 57, wherein the plurality of properties of the blend of the sample comprises viscosity and a percentage of silica-binding agent reacted with silica reinforcing filler.

Claim 59 (new): The process of claim 58, wherein the plurality of properties of the blend of the sample are determined in an absence of a crosslinking system.

Claim 60 (new): The process of claim 57, wherein the plurality of properties of the composition of the sample before vulcanization comprises viscosity, a percentage of silica-binding agent reacted with silica reinforcing filler, and rheometric properties.

Claim 61 (new): The process of claim 57, wherein the plurality of properties of the composition of the sample after vulcanization comprises density, hardness, modulus of elasticity, breaking load, and elongation.